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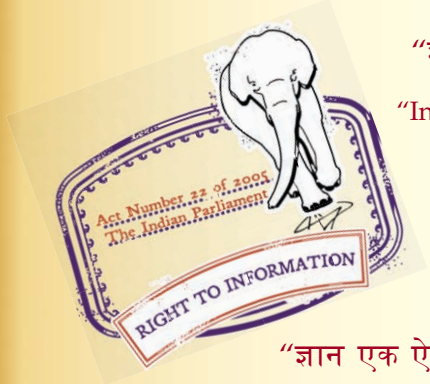
IS 12448-4 (1989): Basic testing procedures and measuring methods for electromechanical components for electronic equipment, Part 4: Dynamic stress tests [LITD 3: Electromechanical COmponents and Mechnical Structures for Electronic Equipment]



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"Knowledge is such a treasure which cannot be stolen"

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IS 12448 (Part 4) : 1989
(Reaffirmed 2002)

Indian Standard

BASIC TESTING PROCEDURES AND MEASURING METHODS FOR ELECTROMECHANICAL COMPONENTS FOR ELECTRONIC EQUIPMENT

PART 4 DYNAMIC STRESS TESTS

भारतीय मानक

इलेक्ट्रानी उपस्कर के विद्युत यांत्रिक घटकों की आधारभूत परीक्षण प्रक्रियाएं और मापन पद्धतियां

भाग 4 गतिक प्रतिबलन परीक्षण

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 1989

Price Group 2

Electromechanical Components for Electronic Equipment Sectional Committee, LTDC 7

FOREWORD

This Indian Standard (Part 4) was adopted by the Bureau of Indian Standards on 23 March 1989 after the draft finalized by the Electromechanical Components for Electronic Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

The object of this standard (Part 4) is to lay down uniform methods of tests to assess the ability of the components to withstand severities of acceleration.

This standard (Part 4) is based, without any technical change, on IEC Pub 512-4 (1976) 'Electromechanical components for electronic equipment; Basic testing procedures and measuring methods, Part 4 Dynamic stress tests', issued by the International Electrotechnical Commission (IEC).

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

BASIC TESTING PROCEDURES AND MEASURING METHODS FOR ELECTROMECHANICAL COMPONENTS FOR ELECTRONIC EQUIPMENT

PART 4 DYNAMIC STRESS TESTS

1 SCOPE

1.1 This standard (Part 4) covers dynamic stress tests, namely, acceleration (steady state), bump, shock and vibration.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
IS 9000	Basic environmental testing procedures for electronic and electrical items
Part 7 : 1979	Impact Test Sec 1 Stock Sec 2 Bump
Part 8 : 1981	Vibration (sinusoidal)
Part 9 : 1984	Acceleration (steady state)
IS 12448 (Part 2/Sec 1) : 1988	Basic testing procedures and measuring methods for electromechanical components for electronic equipment : Part 2 General examination, electrical continuity and contact resistance tests, insulation tests and voltage stress tests, Section 1 General examination

3 TEST 6a : ACCELERATION (STEADY STATE)

3.0 General

The object of this test is to detail a standard test method to assess the ability of components to withstand specified severities of acceleration.

3.1 Mounting of Specimen

The specimen shall be mounted as specified in the detail specification.

3.2 General Requirements

3.2.1 This test shall be conducted in accordance with IS 9000 (Part 9) : 1984 using the degree of severity specified in the detail specification.

3.2.2 Unless otherwise specified, each specimen shall be wired according to the manufacturer's instructions.

3.2.3 Specimens shall be tested in a manner such that all mechanical features, such as, panel mounting arrangements, and locking and retaining devices, are fully utilized.

3.2.4 The measurements specified in **3.3** shall be carried out prior to the test except those which have been carried out during the final measurements of the preceding test.

3.3 Test Requirements

3.3.1 Contacts shall be monitored continuously during this test. Unless otherwise specified in the detail specification, during the test, monitoring of electrical continuity shall be carried out on contacts and screen (where fitted) connected in series.

3.3.2 At the conclusion of the test, the specimen shall be subjected to the following tests unless otherwise specified in the detail specification.

3.3.2.1 *Visual examination*

The specimen shall be visually examined without dismantling. There shall be no loosening, displacement of parts of mechanical damage such as to impair operation.

3.3.2.2 *Operation check*

The mechanical operational characteristics shall be checked aocording to the detail specification.

3.3.2.3 *Contact resistance*

The contact resistance shall be measured in accordance with the detail specification and shall not exceed the maximum specified value.

3.3.2.4 *Sealing*

The specimen shall be subjected to the sealing test specified in the detail specification. Leakage rate across all seals including panel seals, shall not be greater than that specified in the detail specification.

3.4 Details to be Specified

When this test is required by the detail specification, the following details shall be specified in addition to those specified in IS 9000 (Part 9) : 1984:

a) Method of mounting specimen and associated cable(s)/wire bundle, including the unsupported length of cable from contact to first clamp;

b) Severity, acceleration level;

c) Severity, duration;

d) Axes and direction of acceleration;

e) Type of cable/wire bundle, its size and length;

f) Operational characteristics to be checked (both during and after acceleration);

g) Applicable electrical continuity test method, contact resistance test method and the contacts to be monitored (in the case of switches, the operating conditions) and requirements; and

h) Any deviation from the standard test method and/or conditions.

4 TEST 6b : BUMP

4.0 General

The object of this test is to detail a standard test method to assess the ability of components to withstand specified severities of bump.

4.1 Mounting of Specimen

The specimen shall be mounted as specified in the detail specifications.

4.2 General Requirements

4.2.1 This test shall be conducted in accordance with IS 9000 (Part 7/Sec 2) : 1979 using the degree of severity specified in the detail specification.

4.2.2 Unless otherwise specified, each specimen shall be wired according to the manufacturer's instructions.

4 2.3 Specimens shall be tested in a manner such that all mechanical features, such as, panel mounting arrangement, and locking and retaining devices are fully utilized.

4.2.4 The measurements specified in **4.3** shall be carried out prior to the test except those which have been carried out during the final measurements of the preceding test.

4.3 Testing Requirements

4.3.1 Unless otherwise specified in the detail specification, during the last 200 bumps, monitoring of electrical continuity shall be carried out on contacts and screen (where fitted) connected in series.

4.3.2 At the conclusion of the test, the specimen shall be subjected to the following tests unless otherwise specified in the detail specification.

4.3.2.1 *Visual examination*

The specimen shall be visually examined without dismantling. There shall be no loosening displacement of parts or mechanical damage such as to impair operation.

4.3.2.2 *Operational check*

The mechanical operational characteristics shall be checked according to the detail specification.

4.3.2.3 *Contact resistance*

The contact resistance shall be measured in accordance with the detail specification and shall not exceed the maximum specified value.

4.3.2.4 *Sealing*

The specimen shall be subjected to the sealing test specified in the detail specification. Leakge rate across all seals including panel seals, shall not be greater than specified in the detail specification.

4.4 Details to be Specified

When this test is required by the detail specification, the following details shall be specified in addition to those specified in IS 9000 (Part 7/ Sec 2) : 1979 :

a) Type of cable/wire bundle, its size, length and method of mounting including the unsupported length of cable from contact for first clamp;

b) Operational characteristics to be checked;

c) Contacts to be monitored (or other characteristics appropriate to the particular component);

d) Contact resistance test method(s) to be used; and

e) Any deviation from the standard test method and/or conditions.

5 TEST 6c : SHOCK

5.0 General

The object of this test is to detail a standard test method to assess the ability of components to withstand specified severities of shock.

5.1 Mounting of Specimen

The specimen shall be mounted as specified in the detail specification.

5.2 General Requirements

5.2.1 This test shall be conducted in accordance with IS 9000 (Part 7/Sec 1) : 1979, using the pulse shape and degree of severity specified in the detail specfication.

5.2.2 Unless otherwise specified, each specimen shall be wired according to the manufacturer's instructions.

5.2.3 Specimens shall be tested in a manner such that all mechanical features, such as panel-mounting arrangements, and locking and retaining devices are fully utilized.

5.2.4 The measurements specified in **5.3** shall be carried out prior to the test except those which have been carried out during the final measurements of the preceding test.

5.3 Testing Requirements

5.3.1 Unless otherwise specified in the detail specification, during the test monitoring, the electrical continuity shall be carried out on contacts and screen (where fitted) connected in series.

5.3.2 At the conclusion of the test, the specimen shall be subjected to the following tests unless otherwise specified in the detail specification.

5.3.2.1 *Visual examination*

The specimen shall be visually examined without dismantling. There shall be no loosening, displacement of parts or mechanical damage such as to impair operation.

5.3.2.2 *Operational check*

The mechanical operation characteristics shall be checked according to the detail specification.

5.3.2.3 *Contact resistance*

The contact resistance shall be measured in accordance with the detail specification and shall not exceed the maximum specified value.

5.3.2.4 *Sealing*

The specimen shall be subjected to the sealing test specified in the detail specification. Leakage rate across all seals including panel seals, shall not be greater than that specified in the detail specification.

5.4 Details to be Specified

When this test is required by the detail specification, the following details shall be specified in addition to those specified in IS 9000 (Part 7/Sec 1) : 1979:

a) Type of cable/wire bundle, its size, length and method of mounting, including the unsupported length of cable from contact to first clamp;

b) Severity, acceleration;

c) Severity, duration;

d) Axes and direction of shock;

e) Pulse shape;

f) Operational characteristics to be checked;

g) Contacts to be monitored (or other characteristics appropriate to the particular component), and contact resistance test method(s) to be used; and

h) Any deviation from the standard test method and/or conditions.

6. TEST 6d : VIBRATION

6.0 General

The object of this test is to detail a standard test method to assess the ability of components to withstand specified severities of vibration.

6.1 Mounting of Specimen

The specimen shall be mounted as specified in the detail specification.

6.2 General Requirements

6.2.1 This test shall be conducted in accordance with IS 9000 (Part 8): 1981 using the degree of severity specified in the detail specification.

6.2.2 Unless otherwise specified, each specimen shall be wired according to the manufacturer's instructions.

6.2.3 Specimens shall be tested in a manner such that all mechanical features, such as panel-mounting arrangements, and locking and retaining devices are fully utilized.

6.2.4 The measurements specified in **6.3** shall be carried out prior to the test except those which have been carried out during the final measurements of the preceding test.

6.3 Testing Requirements

6.3.1 Unless otherwise specified in the detail specification, during the whole of the last frequency sweep in both directions, monitoring of the electrical continuity shall be carried out on contacts and screen (where fitted) connected in series.

6.3.2 The specimen shall be vibrated in each of three mutually perpendicular directions, one of which shall be parallel to the axis of the specimen.

6.3.3 At the conclusion of the test, the specimen shall be subjected to the following tests unless otherwise specified in the detail specification.

6.3.3.1 *Visual examination*

The specimen shall be visually examined according to Test 1a of IS 12448 (Part 2/Sec 1) : 1988 of this series of standards without dismantling. There shall be no loosening, displacement of parts or mechanical demage such as to impair operation.

6.3.3.2 *Operational check*

The mechanical operation characteristics shall be checked according to the detail specification.

6.3.3.3 *Contact resistance*

The contact resistance shall be measured in accordance with the detail specification and shall not exceed the maximum specified value.

6.3.3.4 *Sealing*

The specimen shall be subjected to the sealing test specified in the detail specification. Leakage rate across all seals, including panel seals, shall not be greater than that specified in the detail specification.

6.4 Details to be Specified

When this test is required by the detail specification, the following details shall be specified in addition to those specified in IS 9000 (Part 8) : 1981:

a) Type of cable/wire bundle, its size, length and method of mounting, including the unsupported length of cable from contact to first clamp;

b) Severity of tests (frequency range, displacement amplitude, acceleration amplitude and duration);

c) Requirements for the variation of contact resistance;

d) Operational characteristics to be checked;

e) Contacts to be monitored (or other characteristics appropriate to the particular component), and contact resistance test method(s) to be used; and

f) Any deviation from the standard test method and/or conditions.

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